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VOLUME VI. JUNE, 1889. WHOLE NO. 44.

THE West American Scientist.

A popular monthly review and record for the Pacific Coast.
Official Organ of the San Diego Society of Natural History.

C. R. ORCUTT, - - EDITOR.

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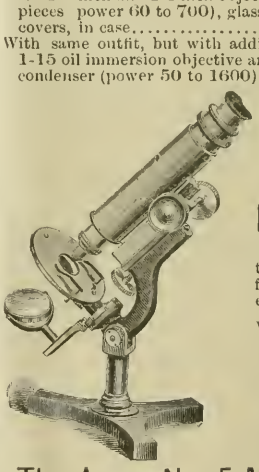

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THE WEST AMERICAN SCIENTIST.

VOL. VI. JUNE, 1889. No. 44

SOME NATIVE FORAGE PLANTS OF SOUTHERN CALIFORNIA.

One would scarcely look at the Colorado desert to furnish any valuable additions to the list of forage plants. The value of the mesquite and allied trees has been mentioned in a former paper, but we now have to treat of other plants which have borne the test for over three years.

A portion of the month of April this year was spent on the borders of this desert, where we were fortunate in making the acquaintance of Mr. Marion D. Haydon, whose hospitality we enjoyed for several days. From this reliable observer we learned many interesting facts, especially concerning the following plants, which information may prove of great economic value in the arid portions of the west.

ALFILARIA.

Alfilaria (Erodium cicutarium, L'Her.) was found abundantly around Mr. Haydon's desert ranch, which is located on the edge of a sandy plain, surrounded by granite hills on several sides and locally known as the Dos Cabesas from two hugh rocks above the spring resembling human heads in their general contour. He had a small band of horses and cattle which he proposed to pasture all of this summer on the surrounding plains. To a stranger the alfilaria might seem to have been the only food obtainable by the cattle. While at this season it was doubtless relished by the stock better than anything else, yet it will be seen later that it was not the only available forage. Eight years ago not a plant of alfilaria was to be seen growing on this desert where now it is so abundant. It made its first appearance on the desert slope at about that time around the old stage station at Mountain Springs, where it is now luxuriant. Erodium moschatum was not observed, although near the coast it is usually mixed with the other species, especially in moist valley land. It will be seen how easily the alfilaria may have been introduced from Europe and have spread so rapidly as to be now considered by some as actually indigenous to our country.

"GIETTA" GRASS.

Only one true grass was found growing on these sandy plains of the desert, although a few others grew among the rocks in the canyons. This grass is Hilaria rigida, known to the ranchmen

in the mountains as the "gietta" grass—a name furnished by the Mexicans, the true spelling of which I was unable to determine. It grows abundantly on the open plain to a height of one to two feet, forming dense bunches which are, however, rather scattering as a rule. It seemed to delight in the finest sand that was apparently free (at the surface) from all foreign substances and where no other plants could be found growing. I easily cut it for my horses with a pick, and could with this implement form quite a bale in a few minutes. As its specific name indicates, it is a rigid, unbending grass which will break sooner than yield. The large amount of starch embodied in its stalks may be considered to account for this stiff nature which it possesses. For several years Mr. Haydon has cut this grass for hay, and fed it to his horses and cattle, with satisfactory results. Horses soon learn its good qualities in spite of its rather discouraging stiffness.

Deer Weed.

Another plant extending through our hills and mountains from the sea shore to the sandy plains of the desert, where it is equally abundant with the last, is the deer weed (Hosackia glabra). Each plant forms a dense spreading bush, one to three feet high, bearing a profusion of small yellow flowers followed by small pods. It belongs to the pea family and nearly related to the alfalfa and clovers. It grows in dry situations, among the brush on our driest mesas and on the open plains of the Colorado desert, where it blossoms in April and ripens fit to cut by June. Its name among the mountains indicates that it is a favorite with deer, but its value might not have been suspected, except for the necessity of using everything available when on the desert. Mr. Haydon was probably the first to utilize it, having cut it for hay for three years, and reports it as fattening for stock, and good, strong forage. The plant in bloom also supplies an excellent pasture for bees.

Franseria.

A little boy in Nevada, writing to the editor of the *Swiss Cross*, say of the sage brush: "When cattle can get nothing else, they eat the young shoots." We would suppose that no horse or cow, in the presence of other food, would touch the allied Franseria dumosa, a common bush among the hills bordering the Colorado desert, and extending also over a large portion of the plains. It is very bitter, usually stiff and dry—but quickly reviving after a little shower. Still we are informed by Mr. Haydon that this forms one of the most valuable of the native plants, and that without having learned its value he could not have explored the desert as he has done. It is a strong, healthy food, and horses acquire a taste for the burr-like fruit, which it produces in abundance.

C. R. Orcutt.

HIS PRAISE.

Even the desert hath a flower,
  His praise to offer up,
Who fashioned it in beauty there,
  And filled its fragrant cup.

Even the desert hath a flower,
  A lily formed to breathe
His praise upon the glowing air,
  Sweetly at morn and eve.

And o'er it bends the starry night,
  And from the distant sea,
From beaming star and throbbing wave,
  His praise makes melody.

And yet the little desert flower,
  As far as in it lies,
His praise and glory spreads abroad
  As much as seas and skies!

E. E. Orcutt.

AN INDIAN MYTH.

In approaching the confines of the Colorado desert this spring, we found a snake story in circulation among the mountain men that surpassed any similar tale that had reached my ears, and which in one sense is worthy of record. The story or myth seemed to lose nothing in being repeated, and the two rattlesnakes—the subject of the myth—had reached the final length of "forty feet and were still growing" when last heard from!

The Indian myth, from the first narrator (as given to him by the Indians themselves) is substantially as follows: Two immense rattlesnakes, measuring from sixteen to seventeen feet in length, inhabit a cave in a rocky mountain on the desert, known as the "mysterious mountain." This mountain is partially (and at times wholly) covered by drifts of sand which are formed and whirled on the mountain by the wind storms frequent in that region. For eight years the mouth of this cave where the rattlesnakes live has been stopped by sand, which has now been blown away, so that the snakes are virtually on "free exhibition," and, it is said, will not offer to disturb any one who may wish to visit them. But if any one offers to disturb their majesties, the snakes will begin to rattle furiously and raise a terrific sandstorm on the mountain that will bury the disturber of their peace in sand.

After the victim has been thus suffocated, the sand will be again blown away, exposing him for the delectation of their palate. No Indian will venture to show the cave to a white man without he agrees not to offer to disturb these snakes, and some

say that the snakes feed only on human beings—those only, who from cupidity or malice, attempt to disturb them.

At the base of the mountain a large Indian burying ground is said to exist. Upon a death in a camp the body would be placed in the sand, and then a large and heavy stone would be placed on the dead person's breast. After that every relative or friend would break an olla on the stone, thus forming a mound of broken pottery to mark the spot, and to prevent either coyotes or the strong winds from exhuming the body. The largest of these cemeteries is reported as about one hundred feet in circumference. These Indian tribes have now virtually passed away, and to-day the places which knew them is an uninhabited waste of sand.

C. R. Orcutt.

CONTRIBUTIONS FROM THE SAN DIEGO BIOLOGICAL LABORATORY.

ISESTHES GILBERTI JORDAN.—The eggs of this species are quite remarkable in structure and coloration. To the unaided eye they appear opaque, of a purplish pink, inside which is a spot of brownish red and upon this a dot of white. The greater portion of the egg is covered by a simple thin, transparent membrane, but at one pole of the egg the membrane is provided with a white cushiony cap formed of numerous filaments which are slightly thickened at their tips and woven together at their free ends. In the small size of these filaments, their great number and aggregation at one pole, they differ from all other appendages of fish eggs yet described. The egg fastens itself to foreign bodies by means of this cushion; when once fastened the egg becomes depressed, the longer and shorter axis measuring .8 and .5 mm. respectively. The yolk is composed of rather large spheres; on its upper surface are imbedded an equal number of pale yellow and bright purple oil globules, in the midst of which is the white body referred to above. Younger ovarian eggs are entirely purple, while still younger ones are colorless. The germinal disk invariably lies beneath the cushiony cap, whether the cap lies above, below or at one side of the egg. The relative specific gravity has, in this case therefore, nothing to do with the position of the germinal disk.

The first segmentation is completed in about ten hours and results in much elongated elliptical cells. Most of the stages are obscured by the peculiar cap. After one hundred and thirty-two hours the eyes are well formed and the embryo embraces about one-half the yolk; several pigment cells are formed on the yolk at this time. On the seventh day the heart beats slowly, the pigment spots have increased considerably and the embryo has become independent of the "cap." The embryos were kept sixteen days when they died.

Oligocottus analis Girard inhabits rocky pools on the ocean beaches about San Diego. Its eggs, like those of many other cottoids, are glued together as they are extruded from the ovarian duct. The spawning period of this species probably extends from January to April. The egg measures 1.2 mm., is of a brownish-yellow color and has one large, and from five to nine smaller oil globules. The egg is surrounded by a thick zona, which appears to be perforated by two sets of canals—the usual fine ones and fewer, much coarser canals. In optical section, the latter appear as black lines. The eggs hatched in from eighteen to twenty-four days, under seemingly identical conditions. The following peculiar pigmentation distinguishes this species on hatching; a pigment cell above each eye, that over the left eye always larger; a group of pigment cells on the nape, the upper two being somewhat removed from the rest, a broad black shield of pigment cells overlying the body cavity; about thirty-four pigment cells along the lower margin of the tail.

Micrometrus aggregatus Gibbons.—In dissecting the ovaries of this species, nodules in the ovarian stroma, were repeatedly observed, which were much larger than the ripe eggs of 2m m. diameter. On sectioning these nodules, they were found to be eggs, much larger than the normal size, measuring .5 mm. in diameter. From the fact that the young of these fishes remain in the ovary from four to five months and are abundantly supplied with food from the time of hatching to the time of leaving the ovary, it may be inferred that a great amount of food is not needed in the egg, and that the eggs are consequently reduced to a minimum size. The comparatively frequent presence of the larger eggs suggests that they are a reversion to a condition when these fishes were oviparous and required more yolk. The nucleus in the larger eggs does not differ in size from that of the smaller, the increase in size being entirely restricted to the food portion of the egg, another fact tending to prove that the smaller eggs have been reduced from formerly larger eggs.

Stolephorus.—There are three species of this genus found in San Diego Bay; ringens compressus and delicatissimus. In May, great numbers of Stolephori which are probably the young of ringens, are swarming in the bay and are especially abundant near the wharf of the Pacific Coast S. S. Company, the eggs of the first and last of these species are oval in shape and pelagic. Slightly oval pelagic eggs have been recorded before, but none in which the longer axis is so strikingly greater than the shorter. We have detected three sizes, having the longer axis to the shorter as 7 to 5, as 8 to 4, and as 8 to 5. As variations between the last two are found in great abundance, they probably are identical. The germ for obviously mechanical reasons always collects at one end of the longer axis, most probably the micropylar end. If this is so, these eggs will serve well to study the relation of the

animal pole of the ovum to the ovary. The eggs can be collected in great numbers in April and May, but we have not succeeded in finding more than two or three eggs in which the gastrula did not cover at least half of the yolk. The eggs are deposited in the evening, just where we have not been able to find. The later stages are abundant about the P. C. S. S. Co's. wharf. The yolk is collected in large masses and is perfectly transparent. The embryos hatch in two days. We have succeeded in keeping the fishes two days after hatching. At this time the yolk is nearly absorbed.

TYPHLOGOBINS CALIFORNIENSIS STEINDACHNER.—This is the most remarkable of the fishes found at San Diego. It is very abundant under large rocks, on the southern shore of Point Loma. It lives in the holes made by a Carideoid crustacean, with which it is usually found associated. It is very tenacious of life and many individuals were kept in confinement several months. Some which were gradually placed in fresh water, remained active for a week, when they began to swell. On being again transferred into salt water all but one survived. They frequently swim (in confinement) at the surface of the water, back down, their ventrals using the surface of the water as a plane for attachment. The fully grown individuals are entirely destitute of vision and seem merely to have an uncomfortable feeling in direct sunlight. Ordinarily they will hide under transparent objects as readily as under a dark one. A test tube which was accidentally placed in a vessel containing them was completely filled with them. In individuals four centimeters long, the eyes are not covered by so thick a layer of epidermis and they can see some distance in front of them. Any object thrust in front of smaller ones usually causes them to turn when the object is about three centimeters from their eyes, while it does not disturb the larger ones. The eye is very small, the crystaline lense comparatively large. The optic nerve is extremely thin, but has been traced to the brain, both by maceration and by dissection. There seems to be no difference in the structure of the visual organs between the smallest and largest individuals. The early stages have not been observed, but we doubtless are here dealing with a case of retardation rather than of degeneration.

The eggs of this species present some thoroughly new features. Several females spawned while in confinement, but did not develop. The eggs are oval. They are surrounded by the usual zona radiata and *a network of threads*. The meshes of this net are coarsest near the vegetable pole of the egg and finer toward the animal pole, near which they form a second membrane, perforated by a few holes only. This *network of threads is attached to the zona radiata around the micropylar region.* This condition is approached most nearly in osmeus eperlanus, where a second

membrane seems to bear the same relation to the zona, as the network of filaments does in this case. Before the eggs are deposited, this net work is stripped off the egg and forms a strand. The strands of different eggs serve to bind them together. The eggs thus come to be laid in clusters resembling bunches of grapes. The yolk is bright lemon yellow, the germ granular and opaque white. There are many oil globules imbedded in the yolk. On comparing these eggs with those of the crustacean, with which they associate and whose eggs are deposited at the same date, they are found to resemble them to a marked degree, and the thought naturally suggests itself that the first eggs mimic those of the crustaceans. In many cases, when for some reason or other, the eggs were injured they expanded greatly in the direction of their long axes, so that they became canoe-shaped, measuring in one case .8x1.8mm.

Carl H. & Rosa S. Eigenmann.

LIST OF BEETLES OF THE GENUS AMARA TAKEN RECENTLY IN COLORADO.

(Compiled from the Record Book of the Colorado Biological Association.)

For the identification of the species here enumerated the association is indebted to Dr. John Hamilton, Prof. C. V. Riley and the U. S. National Museum.

Amara polita, Lec., Custer Co., Wet Mountain Valley.

Amara confusa, Lec., W. Custer Co., W. Fremont Co.

Amara n. sp., Fremont Co., W. Custer Co.

Amara musculus, Say, W. Custer Co.

Amara terrestris, Lec., W. Custer Co., Fremont Co., Canyon City, N. E. Mesa Co.

Amara cylindrica, Lec. ?, W. Custer Co.

Amara interstitialis, Dej., Summit Co., Slate Creek, W. Custer Co., Pueblo Co.

Amara fallax, Lec., S. Pueblo Co.

Amara erratica, "Sturm" var., W. Custer Co.

Amara laticollis, Lec., W. Custer Co.

Amara remotistriata, Dej., E. Montrose Co.

Amara gibba, Lec. ?, W. Fremont Co.

Amara obesa, Say, W. Custer Co.

Amara aenea, W. Custer Co. near Ula.

Amara latior, W. Custer Co. *T. D. A. Cockerell.*

West Cliff, Colo., May 16, 1889.

HOURS FOR VISITORS TO THE LICK OBSERVATORY.

The Observatory buildings will be open to visitors during office hours, every day in the year. Upon their arrival, visitors will please go at once to the visitor's room and register their names.

An hour or so can be profitably occupied in viewing the various instruments, and the rest of the stay can be well spent in walks to the various reservoirs, from which magnificent views of the surrounding country can be had. At least an hour and a half of daylight should be allowed for the drive from the Summit to Smith Creek. *There are no hotel-accomodations at the Summit.*

For the present, visitors will be received at the Observatory to look through the great telescope every Saturday night, between the hours of *7* and *10*, and *at these times only.*

Whenever the work of the Observator will allow, other telescopes will also be put at the disposition of visitors on Saturdays between the same hours (only).

At *10* P. M. the Observatory will be closed to visitors, who should provide their own conveyance to Smith Creek, as there is no way of lodging them on the mountain.

It is expected by setting apart these times for visitors (which allow freer access to the Lick Observatory than is allowed to any other observatory in the world) that all interested may be able to arrange their visits in conformity to them; and that the remaining hours of the week will be kept entirely uninterrupted, in order that the Astronomers may do the work upon which the reputation and the good name of the Observatory entirely depends.—*Edward S. Holden, Director.*

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

San Francisco Microscopical Society—April 10, 1889. Mr. A. B. Leckenby spoke briefly of the difficulties often experienced by the tyro in manipulating the numerous forms of insect life for slide-mounting and lantern projection, and described the method pursued by him as embodying the result of many years of patient application to the subject. Starting with the coleoptera, or beetle family, the first step is to devitalize them quickly and while they are in flight, which the gentleman accomplishes by dropping them through a long glass tube into boiling water. The elytra and wings are by this means immovably fixed in the extended position, and remain unaltered during the subsequent operations. The body of the insect is then injected hypodermically with a strong solution of caustic potash and allowed to remain three or four hours, then transferred to a glass slip and gentle pressure applied, when the vicera and other tissues form-

ing the interior of the body will be expelled. To dehydrate or remove the watery portion, absolute alcohol is generally recommended, but the lecturer contended that it was expensive and not always at hand, while equally good results would follow by placing an ounce or two of refined gelatine in a vessel, pouring on alcohol of 95 per cent. and immersing the object for a short time--the gelatine, from its affinity for water absorbing that fluid from both the object and alcohol.

The insect is then placed in oil of cloves to clear or render it transparent, and is ready for mounting permanently in balsam. By this method, the insect is rendered entirely transparent, the peculiar geometrical markings of the wings, the abdominal and thoracic rings and the various parts forming the head and limbs, are beautifully displayed.

In preparing the Lepidoptera, a somewhat different course is pursued, as the wings of all butterflies and moths, being covered with easily detached scales, must be protected. The butterfly or moth is placed on a square of glass and liquid paraffine flowed carefully over the entire insect. After cooling, a small aperture is made, exposing a portion of the body and caustic potash injected; the subsequent operations being the same as for beetles, excepting that sulphuric ether must be used to dissolve off the paraffine, leaving the soft velvety covering of the wings unimpaired.

In this manner are prepared the beetles, dragon-flies, bees, wasps, caterpillars, etc., and when mounted in balsam, they form some of the most beautiful and instructive objects imaginable whether viewed through the microscope or projected on the screen. Mr. Leckenby exhibited many fine specimens of his handiness in preparing and mounting the different orders of the insect world, noticeable among which were a gigantic tarantula, several gorgeous Papilios, fierce-looking dragon-flies, beetles, wasps and a large collection of small objects.

April 24, 1889.—A fine series of photographs was exhibited, containing some graphic enlargements on the new Eastman bromide paper. This process of enlarging on bromide paper produces excellent results, the effect when exposure and negatives are properly manipulated being almost equal to steel engravings. Examples were shown of Pleurosigma Angulatum the negatives of which were taken at a magnification of sixteen hundred diameters.

The bromide process commends itself to those interested in photomicography by its simplicity compared with the tedious work of printing from silver paper.

Mr. Lickenby concluded his practical demonstration of preparing and mounting insects in balsam. It is quite difficult in preparing many of the smaller forms of insects to remove the de-

bris from the surface of the specimen without injuring the delicate portions. This the gentleman accomplished by the aid of albumen, flowing the white of an egg over the object and immersing the slide in hot water till the albumen is coagulated, when it will generally crack open and may be removed in two portions carrying with it all the foreign matter and leaving the surface of the specimen perfectly clean. Another thing strongly advocated is thorough washing of the objects in running water and a final rinsing in either filtered or distilled water before placing in alcohol.

In mounting, the insect is placed under the cover glass arranged in proper shape, the clearing solution applied, and when sufficiently transparent the oil of cloves is drained away and Canada balsam introduced at one edge of the cover glass, the slide being held over the flame of a lamp to gently warm the balsam and allow it to flow in and displace the remaining oil of cloves. No annoyance need be felt at the presence of bubbles of air, as they all will gradually disappear. The mount, when filled with balsam, is placed in a warm oven or incubator and kept at a temperature of from 120° to 130° Fahrenheit for twenty-four hours, when the balsam will be thoroughly hardened and all the air bubbles driven out.

Mr. Lickenby does not advocate the use of volatile solvents with balsam, he being convinced that a certain amount of gas is always retained in the mount in a latent state, requiring only a slight amount of heat to produce bubbles and disfigure the specimen. The outer skeleton of insects is composed of a substance called *chitine*, which is quite unique in its chemical composition. It appears to be, within certain limits, very resistant to acids and alkalis, and it is owing to this fact that caustic potash can be used in such varying proportions in treating them for microscopical study. It is said, however, that *chitine* succumbs to the action of chlorine compounds, which would render that substance unfit for use in bleaching many of the delicate forms.

May 8, 1889.—The microscope has scored another point in bringing to light the hidden treasurers of the Golden State. Among the visitors present were A. W. Craig and W. E. Brainbridge. The latter gentleman gave a good description and exhibited samples of a remarkable find located by him in Ventura county, near the head of the Sespe river. It consists of what is called "gem sand",which,when examined with a power of about fifty diameters, is seen to consist largely of garnets, zirconite and what parties to whom the material was submitted in the Eastern States pronounced to be diamonds.

The gems, to be sure are small, appearing only the size of a rape seed when magnified fifty diameters, but the presence of such quantities of minute stones surely indicates the existence of larger members of the same family.

Mr. Brainbridge remarked that he had no doubt thrown away numbers of the larger stones, thinking them loose quartz crystals, as he was only panning out the sand to find gold or large garnets.

Professor Hanks stated that the small stones, said to be diamonds, had all the characteristics of a California diamond, and his opinion is worthy of attention, as he has made a close study of the gem.

The metal platinum is also present in this sand, but whether in quantity sufficient to make it of commercial importance, has not yet been ascertained.

The zirconite occurs in square prisms with pyramidal terminations, and the stones are of a light brown color and very transparent. Altogether, the discovery of Mr. Brainbridge is a remarkable one, and its future investigation will be watched with great interest. It might be mentioned that the sand, of which samples were shown last evening, extends over a space of one-half to three-quarters of a mile wide by several miles in length.

Mr. Wickson exhibited a peculiar entomological phenomenon —the common aphis attacked by the 'Fly cholera', *Empusa muscæ*. The gentlemen explained how the fungus spores lodge on, or become attached to the body of a fly, immediately commence growing and penetrate through the skin. Once inside, the spore rapidly increases by self-division, in the manner of yeast cells. The first stage of the disease is indicated by the restlessness of the attacked flies; they soon, however, became weak and slow in their motions. Having securely fastened themselves with their broad tongues to the object upon which they happened to be when attacked by the last stages of the disease, a succession of spasmodic tremors pass through their wings and legs and they stiffen themselves out to fly no more.

The abdomen of the victim of this disease, previously already swollen, becomes more and more distended, and a fatty, whitish substance pushes through the softer membranes between the chitinous rings or segments. Soon after a whitish halo of spores is formed around the dead body, readily seen, if the fly happens to have fastened to the glass of mirror or window-pane. These spores gradually cover the whole insect with a white dust and they appear in ever-increasing numbers as the body of the victim dries up, until at last its whole interior is empty and only a shell remains. From an examination of the affected aphis, there appeared no reason to doubt but that the fungus developed and ran its cause the same as in the fly, their bodies being distended and surrounded with the white halo of filaments bearing ripe spores ready to be thrown off and carry on their work of inoculation.

It was suggested that here might be found a remedy for these annoying pests by systematically inoculating *Aphis colonies*

when existing epidemically, and Mr. Wickson stated that such a course had been spoken of, but could not say that it had ever been carried out. Unfortunately, the more destructive of the fruit and grain pests, do not seem to be seriously attacked by this fungus, although the chinch bug has an inveterate enemy in an allied fungus termed *Entomophthora*, which also carries off the larvæ of certain butterflies.—*C. P. Bates Recording Secretary.*

National Academy of Sciences, Washington, D. C.—April 17, 1889.—Prof. Othaniel C. March was re-elected President, and Prof. S. P. Langley, Secretary of the Smithsonian Institution, elected Vice-president. After the election, the members of the Academy called on the President of the United States, at the White House

The papers presented at this meeting of the Academy were as follows:

On Composite Coronography, by I. P. Todd; Memoir of Prof. S. F. Baird, by Dr. Billings; Memoir of Dr. Asa Gray, by Dr. W. G. Farlow; Determinations of Gravity, by Mr. C. S. Peirce; On the N. A. Probocidita, by Prof. E. D. Cope; On the Mass of Saturn, by M. A. Hall, Jr.; On the Nature and Composition of the Double Hallides, by Prof. Ira Remsen; On the Rate of Reduction of Nitre Compounds, by Prof. Ira Remsen; On Some Connection Between Taste and Chemical Composition, by Prof. Ira Remsen; Recent Researches in Atmospheric Electricity, by Prof. T. C. Mendenhall; Measurements by Light Waves, by Profs. A. A. Michelson and E. W. Morley; On the Feasibility of the Establishment of a Light Wave as the Ultimate Standard of Length, by Profs. Michelson and Morley; Additional Experimental Proof that the Relative Coefficient of Expansions Between Baily's Metal and Steel is Constantly Between the Limits of Zero and 95 Degrees of Temperature, by Prof. W. A. Rogers.

The Colorado Biological Association.—The recent election of officers has resulted as follows: — President, C. F. Morrison; Secretary, T. D. A. Cockerell; Treasurer, H. G. Smith, Jr.; Council, Dr. C. H. Merriam, H. W. Nash, Prof. A. S. Packard, D. W. Park, Prof. J. M. Coulter and D. Gale.

The membership is now sixty-three, the following having joined during the last six weeks: Dr. E. B. Landis, H. Todenwarth, J. Bentley, L. Stejneger, S. C. Cockerell, Prof. James Cassidy, Dr. D. O'Brine, Miss E. L. Morton, C. A. Cooper, Miss Alice Eastwood, B. T. Galloway and H. A. Pilsbry.

The additions to the fauna and flora of Colorado, as recorded in the books of the association, have been during April, 1889: Mammalia, 1; Birds, 1 var.; Reptiles, 3; Amphibia, 2; Fishes, 1; Mollusca, 2 vars. and 1 fossil species; Coleopter, 4; Hymenop-

tera, 749; Thysanura, 1 fossil; Phœnogamia 1 and 5 vars. and 2 fossil.

Among recent records entered in our books, the following are especially noteworthy:

Pityophis sayi mexicanus, Arapahoe Co., (H. G. Smith, named by L. Stejneger.)

Bufo lentiginosus woodhousei, Arapahoe Co., (H. G. Smith, named by L. Stejneger.)

Succinea lineata, Binney., Kremmling, Grand Co., (T. D. A. C., named by R. E. C. Stearns.)

Agabus morosus, Lec., West Cliff, Custer Co , (T. D. A. C. named by Dr. John Hamilton.)

Lachnosterna crinita, Burm., near Swift Creek, Custer Co. (T. D. A. C., named by Prof. C. V. Riley.)

Orchester minutus, near Swift Creek, Custer Co., above 8,000 ft. (T. D. A. C., named by Dr. J. Hamilton.)

Chrysomela montivagans, Willow Creek, Custer Co., 8,400 ft. alt. (T. D. A. C., named by Dr. J. Hamilton.)

Callidryas philea L , ♂, Arapahoe Co., (H. G. Smith, named by H. W. Nash)

Crambus sericinellus, Tell., W. Custer Co., (T. D. A. C., named by Hy. Edwards.) *T. D. A. Cockerell, Secretary.*

West Cliff, Colo., May 16, 1889.

BRIEFER ARTICLES.

The Loco Weed—The disease commonly termed loco among stock men, which especially affects the horses throughout the West, is one generally to be dreaded. It is usually ascribed to the diseased animal having fed upon some one of the many large species of Astragalus of which different species are found in different parts of our country. If eaten green the plants seem to have no injurious effect—at least not so noticeable—but eaten dry it soon proves fatal. A tea made from the Astragalus found in New Mexico, given in three doses of a pint each to an old but perfectly healthy horse, caused death in thirty eight hours, according to one man, whose veracity is, however, open to doubt. According to the same authority, an Indian mistook a bottle of the tea for whiskey, resulting in a rush of blood to the head and death in three hours. At Fort Whipple barracks, A. T., alfalfa hay mixed with the loco weed rendered the horses crazy and foolish, refusing to be led, and relief was only afforded by bleeding in the neck veins. But no evidence agreeing with the above yet known to have been placed on record, that is sufficient to convict any plant. Some have ascribed the loco disease to the presence of ticks in the horses ears, and their penetrating to the brain, but the symptoms do not seem to agree with the genuine "loco." This subject is worthy of careful study and investigation, and any further evidence or discussions are invited. *C. R. O.*

A Thorny Path—This morning I found under a piece of cactus in a canyon a beautiful mottled shell of Helix Stearnsiana. The original tenent had not moved from this little home and I soon transferred both house and lodger to my basket. I added a few fungi, some other shells, and two or three plants of the fish hook cactus to the contents of the basket. In a short time I noticed that the snail was restless, and, after investigating the newspaper that lined the basket as well as the fungi, he found the cactus which was evidently a pleasant discovery to him. The heads of the cacti were closely set with clusters of fine white spines and larger central hooked spines which give the variety the name of the fish hook cactus. Carefully feeling his way, the snail ventured upon this sea of spines soon drawing his shell after him, and leisurely crossed the several heads over the needle points of the spines (on which the reader would doubtless hesito rest a finger) and evidently without the least inconvenience. Reaching the spineless base of the farther plant, he rested from his travels—content to remain near the friendly cactus, which furnishes both food and shelter to our Californian snails. *C.R.O.*

Michel Eugene Chevreul.—The distinguished French chemist, Michel Eugene Chevreul. died in Paris, April 9. He was born before the outbreak of the French revolution, studied at Angers with the young Wellington and Napoleon, and went to Paris to push his fortunes a year before the latter became Emperor. Chevreul was born August 31, 1786. in Angers, and lived to see France twice an empire, twice a monarchy and thrice a republic. His father was a well-to-do physician in Angers, professor in the medical faculty and a talented writer. Chevreul was a very tall man, square in the shoulders and walked quite erect and straight.

In 1803, Chevreul entered Vauquelin's laboratory in Paris, where his aptitudes were quickly noticed, and in 1806 he was appointed the director of the laboratory, and professor in the Lycee Charlemagne. In 1810 he was appointed *aide-naturaliste* in the Museum of Natural History, then examiner for the *Ecole Polptechnique*; and at thirty he was professor of chemistry in the Gobelins, the world-known manufactory of tapestry, and director of the department of tinctorial baths. In 1826, after the death of Proust, Chevreul was appointed member of the Academy of Sciences. Not one of his colleagues at that time is now living. He never missed a meeting of the Academy, up to his hundredth birthday, and it is not long since he might have been seen walking to the Institute, hat in hand, and hands behind his back.

As a man, Chevreul had a pleasant expression, amiable, kind-hearted and good-natured, devoid of pedantic manners. His life was a very quiet one, devoted wholly to work and study,

He possessed ample means, enjoyed society, where he was a favorite.

The chemistry of fatty substances, and theory of complementary colors were the two most important lines of study followed and developed by him, Millions have been earned by the application of his methods for obtaining a number of useful substances, such as stearine and glycerine.

THE LATER DEW THEORY.—It is now held by the best physicists that, instead of falling from above, the dew rises from the earth. The generally-received opinion that the dew is formed of vapor exisiting at the time in the atmosphere must be given up for the established fact that the vapor which rises from the heated earth is trapped by the cold surface earth. Besides, when we imagine that, on a cool evening after a sultry day in summer, our feet are being wet by the dew on the grass, we make a grave mistake. For that moisture on the grass is not dew at all, it is not dew at all, it is false dew—in reality the transpired humor of the plants. The drops at the tips, which glisten diamond-like, are not dew; close examination shows that these crystalline spheres are all situated at the points where the veins of the leaves cut the outer edges. These drops only give evidence of the vitality of the plant. The difference between the true dew on the grass and the exuded drops through the veins from within the grass can be easily distinguished; for the former is distributed all over the blade in a moist film; whereas, the latter are of some size, and are situated near the tips of the blade. Altered then is the meaning of the line, "Ilka blade o'grass keps its kin drap o' dew;" for those brilliant globules, shaking to the same sweet air, and often "gliding at once all fragrant into one," are not dewdrops, but are the exudations of the healthy plants. They give evidence of the elixir vitæ of vegetation; whereas the true dew is the pearly luster, varnished in flimy humidity over the blades by that wondrous alchemy which transforms the water vapor rising from the ground into the plant-refreshing dew.—*Good Words.*

MINERALOGICAL NOTES.

PHENACITE FROM MAINE—In May, 1888, some crystals o phenacite were found near Stoneham, in a vein of coarse albitic granite, associated with crystals of smoky quartz, topaz and muscovite.

ARAGONITE PSEUDOMORPH—Among a collection of minerals from Pima county, Arizona, was a crystal originally aragonite, which had been almost entirely changed and impregnated by oxide of manganese and red oxide of iron. It has an outer coating of white cacholong over some simple rhombohedral crystals, now entirely changed to an oxide of manganese. The crystal is hollow on top to the depth of three-fourths of an inch. The sides of

the cavity are lined with cacholong, but the bottom of the cavity is partly filled in with a white compact chalcedony The interior of the crystal is radiated, but is of a dark chocolate color and almost entirely altered to hematite.

ZIRCON—This mineral is now mined by the ton in the United States, and about $150 per ton is paid for it, because of the earth it contains (Zirconia) which is used in the hoods for the new incandescent gas burners. The Zircons are obtained by washing out the soil resulting from the decomposition of felspathic rocks.

OBSIDIAN—Obsidian has been found in British Columbia, but it has little value, except for the cheaper jewelery, and is rarely used for that purpose.

PARIS EXPOSITION—Messrs. Tiffany & Co. exhibit a collection illustrating the occurrence of precious and ornamental stones in North America, containing all the more important varieties, in their natural state and in cut examples. The 352 labels include crystals of gold, gold and silver ornaments from Indian mounds, diamonds, rubies, sapphires, topaz, emerald, beryls, garnets, tourmalines, zircon crystals, peridot, quartz, amethyst, opal, agate, rutile, turquoise, amber and many other minerals not so well known to the public as gems.

TURQUOISE—Additional evidence of the antiquity of the turquoise workings of New Mexico and Arizona has been gathered by the Hemenway Expedition under the direction of Mr. Frank H. Cushing. About ten miles from Tempe, Arizona, a shell encrusted with turquoise and garnet, representing the form of a frog, was found in the excavations.

CHRYSOPHRASE—Beautiful semi-transparent chrysophrase of fine color occurs in Tulare county, California. This gem has also been found in Douglas county, Oregon. *George F. Kunz.*

BIBLIOGRAPHY.

J. JENNER WEIR—Exhibited a female example of Danais plexippus from Custer county, Colorado, to South London Entom. Society. This specimen differed from the examples from more northern localities, in having all the spots on the black apical patch on the fore wings white, instead of fulvous. Mr. Wier also exhibited Pieris oleracea, and stated that he had heard from Mr. Scudder that this species could be readily distinguished from P. Napi in the larval and pupal stages. *Entomologist*, February, 1889; page 52. *T. D. A. C.*

J. W. DOUGLAS—Notes on some British and exotic Coccide. Ent. Mo. Mag., March, 1889. page 232. Notes on Icerya purchasi, partly quoted from Prof. Riley and Mr. R. T. Lewis (in litt.) with figure of the larva of Icerya. Hippodamia ambigua

preys upon Icerya in California, and in South Africa its increase is checked by Rodolia iceryœ and Chrysopa iceryœ.

T. D. A. C.

GEORGE D. HULST—'The Epipaschiinœ of North America,' 1889. Reprinted from *Entomologica Americana*, with a plate illustrating structural characters. Twenty species of this family of moths are described as occuring in North America, and very full details are given, both descriptive and synonymical, although the distribution is very slightly treated. There is also a catalogue of the species, in which, however, one species described in the body of the work (E. Zelleri) has been omitted. Yuma gen. nov., is founded on a species (adulatalis) from S. California and Texas, and Attacapa, gen. nov., on a Texan species. A. callipeplella. Several other species are recorded from the West.

T. D. A. C.

ULTIMATE FINANCE—A true theory of wealth. By William Nelson Black. The Humboldt Publishing Company, 24 East 4th street, New York. The first two chapters treat of the origin of property and the evolution of wealth, the third and fourth discuss the principles and possibilities of banking and insurance, and the fifth, sixth and seventh are devoted to a correction of the many misconceptions that abound on the nature of accumulation, and the administration of property. The book defines a system which, if found organically practicable, will enable men to carry insurance always without sacrifice of personal resources and sometimes with considerable gain.

H. F. WICKHAM—"A list of the Coleoptera of Iowa city and vicinity." Bul. Lab. Nat. Hist., State Univ. of Iowa, Vol. I, No. 1, pp. 81–92. A check list of the Coleoptera of this district, interesting for comparison with the fauna of the central region, from which it very markedly differs. The present recorder took two species, Melanophila atropurpurea and Chrysochus cobaltinus, which are not entered in Mr. Wickham's list, on a C. B. and Q. train near Chariton, Iowa, 1887. It is not certain, however, that they may not have boarded the train in some other State. *T. D. A. C.*

THE JOURNAL OF MYCOLOGY—Vol. 5, No. 1, March, 1889. This is the first number of the new series of this journal, to be published quarterly by the Department of Agriculture, under the supervision of B. T. Galloway. It extends to fifty pages, with eight plates, and like all the other work of the department is thoroughly well done. A new genus, thirteen new species, and two new varieties are described, and there are also articles dealing with the economic side of the question, and reviews of new literature. The most interesting paper to western botanists is one by Mr. W. F. Anderson, on the fungi of Montana. *T. D. A. C.*

THE NAUTILUS—No. 1, May, 1889. The first number contains an important contribution by W. H. Dall, on a species

of Trochus from the Atlantic; and of matters interesting to the west, a note on the occurrence of Limosina sp. in Texas, and a classification of the varieties of Patula cooperi. On page 9 the description of Bulimulus hemphilli, Wright, is referred to, and it is suggested that it might be compared with B. marielinus, Poey.

T. D. A. C

WALTER E. BRYANT—New subspecies of song sparrow from Lower California (Melospiza fasciata rivularis-Brown's song sparrow). Proc. Cal. Acad. Sci., I, 197. This subspecies is dedicated to Mr. Herbert Brown, of Tucson, Arizona.

WALDEMAR LINDGREN—Geology of Baja California, l. c. I, 173. An interesting outline of the geology of the vicinity of Todos Santos bay, extending eastward to the border of the Colorado desert. As so little has been published on the subject, this fragmentary work is a valuable contribution, containing the results of a special trip made in 1888 by the author, who is connected with the U. S. Geological Survey. The cretaceous exposures at Punta Banda were the special attraction as tending to throw more light on similar exposures in the United States, but for which this foreign territory may not have been explored at this time. *C. R. O.*

E. B. WEBSTER—The preservative (embalming) method of taxidermy, with chapters on making skins and skeletons. The author, Cresco, Iowa, 1889. A brief treatise, by the editor of the *Hawkeye Ornith. and Oölogist*, of special value for the young collector, being clear and concise *C. R. O.*

MELVILLE C. KEITH, M. D.—Diseases of children. Part II, Minneapolis, 1889. A valuable treatise for parents and nurses on the care of children, recipes and other medical information. The author is also editor of Mother and Child, a useful magazine for the family, and author of other medical books. *C. R. O.*

EDITORIAL.

A friend asks which we "found the nightier, the pick or the pen?" The pick was decidedly the heavier! In the April issue (VI: 8, lines 22 and 23 from the top) read *millimeters* instead of inches, in the description of Bulimulus Hemphilli. We are indebted to Mr. F. Stevens for a number of scientific papers. We spent an evening in May at his home, looking over some of his fine bird and mammal skins, among others his new fox, the desert pouched rat, and other rare things. Dr. Edward Palmer returned successful from his excursion to the mouth of the Colorado river. Charles T Simpson, in the *Nautilus* for May, enters a protest against the indiscriminate genus making, now fashionable among certain conchologists. The same remarks would apply equally well to some of the work of West American

botanists. Our trips during the last few months have added thousands of insects, shells, plant specimens and a host of other objects to our private museum, which will furnish subjects for numerous contributions to science as soon as they can be placed in the hands of specialists for study. Our correspondents must pardon any seeming neglect on our part, as we are away much of the time. The condition of our post-office and its management furnishes us with a still further excuse frequently, and correspondents should write again if they fail of a reasonably prompt reply.

The mineralogical notes in this issue are selected from several papers received from George F. Kunz, to whom we are indebted for many favors and who keeps us posted on mineralogical news. The San Francisco Microscopical Society, again shows signs of activity. We have missed their interesting reports for some time.

NOTES AND NEWS.

There were only two sun spots during November and December, 1888, this being the year of sun spot minimum.

Rev. J. G. Wood, F. L. S., the well-known naturalist, and author of popular works on natural history, died early in the year.

Of the territory of Africa, England has the controlling influence over 1,000,000 square miles; Germany, 740,000; France, 700,000.

Mrs. M. K. Curran, M. D., recently visited San Diego, collecting numerous plants for the herbarium of the California Academy of Sciences.

W. G. Wright has returned from his trip into Mexico.

T. S. Brandegee has made an extended botanical exploration in Lower California, in company with Walter Bryant, the ornithologist, and others.

S. B. Parish is trying to raise certain classes of plants at his home from seed, to study the constancy of some of their characteristics.

Dr. C. C. Parry devoted some time this spring to the plants of Santa Barbara.

Papaver Californica has been observed abundant in San Diego county by the editor, and also by Mrs. Curran.

No trace of staminodia could be detected in fresh flowers of Hookera Orcutti, Greene, numerous specimens of which were lately carefully examined by the editor. The segments of the perianth are tipped with royal purple; the tube is white.

A large and life-like engraving of Prof. W. O. Atwater embellishes the *American Agriculturist* for March. Prof. Atwater is one of the most prominent agricultural scientists of the times. His articles on science applied to farming, in the *American Agri-*

culturist in previous years, and his extensive field experiments inaugurated (through the same magazine) in many parts of the country, were the most extensive co-operative enterprises of the kind ever undertaken. His articles on food in the *Century Magazine* have gained him a wide reputation. He is now director of the Storrs Agricultural School Experiment Station in Connecticut and chief of the Experiment Station Bureau in the Department of Agriculture at Washington. In the latter capacity especially he has a large field for usefulness, and enjoys the confidence of practical farmers as well as of scientific workers.

A specimen of Haliotis Cracherodii was recently seen in a San Diego shell store, with a brilliant red epidermis like that of H. rufescens. Another shell belonging to H. corrugata possessed an equally curious epidermis, of a purplish or violet color. The color in both of these shells was natural and a most beautiful freak of nature.

Boys will be strongly attracted by E. H. Barbour's biography of a two-headed turtle, in *St. Nicholas* for May, and regret the "Queer Pet's" early decease; and they will share with their sisters keen enjoyment of the mischievous "Cuff, the Orphan Bear-cub."

A new volume of *The Century* began with the May number, the frontispiece of which is one of Mrs. Foote's pictures of the Far West, "Cinching Up." The most timely papers are a series on "Samoa: Ths Isles of the Navigators." The first is by Dr. H. W. Whitaker, of the U. S. Navy, and is profusely illustrated. The second, also illustrated, is on "Our Relations to Samoa," by Mr. Geo. H. Bates. The third paper in this series is a brief one by Captain Erben of the U. S Navy, who commanded the "Tuscarora" when it took Steinberger to Samoa in 1875.

From forty careful drawings of the planet Mars at the Lick Observatory in July and August, 1888, showing the details of the canals as seen through the great telescope, none has been seen *doubled*, as asserted and drawn by European observers of late years. The submerged continent had also reappeared in the great telescope in its former contour.

Dr. David Dietrich, author of the extensive *Forest-Flora*, and curator of the herbarium of the University of Jena, died October 23, 1888, in his ninetieth year.

C. G. Pringle's distribution for 1888 includes about 300 species of plants, mainly collected in the Mexican states of Chihuahua, Nuevo Leon, and Jalisco. Lists will be furnished on application. (His address is Charlotte, Vermont).

On April 6th, 1889, at Wichita, Kansas, the Wichita Academy of Science was organized. Its object is "to promote the study of science and stimulate original investigation." The corresponding secretary is Fred. L. Johnson, M. D.

Shells For Sale by C. R. Orcutt, San Diego, Calif.

Acmaea, Esch.
.15..depicta, Dall
.20..insessa, Hds
.05..mesoleuca, Mke
.15..paleacea
.05..pelta, Esch
.10..var. elevata, Orcutt
.95..testudinalis

Acus, Humphrey.
.50..aureola, Gray
.25..caerulescens, Lam
.25..crenulata, L
.20..denudata
.05..dislocatus, Say
.20..maculata, L
.20..strigillata, Gray
.20..subulata, Lam

Adeorbis, Wood.
.25..subcarinatus, Mont

Adula, H. & A. Adams
.20..falcata, Gld
.15..stylina, Cpr

Alexia, Leach.
.10..personata, Midd
.05..setifer, Cooper

Alvania.
.20..aequiseulpta, Cpr

Amalthea, Schum.
.50..conica, Schum

Amiantis, Cpr.
1.00..callosa, Conr

Amnicola, Gld. & Hld.
.05..cincinnatiensis, Anth
.10..cubeniana, D'Orb
.05..decisa, Hld
.05..grana, Say
.05..integra, Say
.05..lapidaria, Say
.05..limosa, Say
.15..longinqua, Gld
.05..lustrica, Say
.10..pallida, Hld
.20..panamensis, Tryon
.05..parva, Lea
.05..porata, Say
.25..sp. indet, Utah

Amphibola, Schum.
.20..fragilis, L
.12..nux-avellana, Chem

Amphissa, H. & A. Ad.
.10..corrugata, Rve
.10..versicolor, Dall

Ampullaria, Lam.
.50..chiqintensis, D'Orb
1.00..cumingii, Sby
2.00..olivacea, Spix
.50..scalaris, D'Orb

Amycla, H. & A. Ad.
.05..carinata, Hds
.10..var. hindsii, Rve
.15..chrysalloidea, Cp
.10..gausapata, Gld

Anachis, H. & A. Ad.
.10..coronata, Sby
.10..fluctuata, Sby
.10..guatamalensis, Sby
.10..penicillata, Cpr
.20..pygmaea, Sby
.20..rugosa, Sby
.20..rugulosa, Sby
.20..subturrita, Cpr
.20..varia, Sby

Ancillaria, Lam.
.50..accuminata, Lam
.15..ampla, Gmel
.20..candida, Lam
.20..cinnamomea, Lam
.15..fulva, Swains
.75..glabrata, Swains
2.00..montronzieri, Sby
.15..rubiginosa, Swains
.40..tankervillii, Sby
.40..torosa, Mensch
.20..vesicula, Gmel

Anapa, Gray.
.50..triquetra. Hawley

Anculosa, Say.
.10..ampla, Anthony
.05..plicata, Conr
.10..rubiginosa, Lea

Ancylus, Geoffroy.
.05..fluviatilis, L m
.20..lacustris
.15..rivularis

Angitrema, Hald.
.50..angulata, Wetherby

Angulus, Schum.
.10..gouldii
.10..modestus
.10..obtusus, Cpr
.15..variegatus

Anodonta, Cuvier.
2.00..bridgesii, Lea
.50..ca iforniensis, Lea
1.00..corpulenta, Cp
.50..cygnaea, L
1.00..var inflata
1.00..var. limpida
.50..edentula, Say
.75..ferrusaciana, Lea
.25..fluviatilis, Dillw
1.00..grandis
2.00..jewettii, Lea
.50..oregonensis, Lea
1.00..wahlametensis, Lea

Anomia, L.
.20..aculeata, Gmel
.10..ephippium, L
.25..glabra Verrill
.25..lampe, Gray

Aporrhais, Dillw.
.25..occidentalis, Beck
.25..pes-pelecani, L

Asaphis.
.25..dellorata, L

Area, L.
.20..americana
.15..incongrua
.30..mutabilis
.15..noae, L
.30..ponderosa Say
.30..solida, B & S
.30..tetragona
.30..virescens, Rve

Assiminia, Leach.
.10..californica, Tryon

Astarte, Sby.
.15..castanea, Sby
.25..conradi, Shuttl
.25..equimalti, Baird
.15..sulcata, Da Costa

Astyris, H. & A. Ad.
.10..aurantiaca, Dall
.10..chrysalloidea, Cpr
.10..tuberosa, Cpr
.10..variegata, Stearns

Atys, Montfort.
.20..cylindrica

Auricla, Lamarck.
.50..parva, Swainson
.50..aurisnidae, L
.25..elongata, Parr
.05..fasciata, Desh
.25..solida, Swainson

Avicula, Lam.
.25..brevicauda, Desh
.20..hirundo, L
.20..margaritifera, Brug
.25..tarentina

Axinaea, Poli.
.50..maculata, Brod

Bankivia, Beck.
.10..varians, Beck

Barleeia, Clark.
.10..haliotiphila, Cpr

Bithynia, Gray
.15..leachii, Shep
.05..tentaculata, L

Bela, Gray.
.20..brachystomoides

Bittium
.05..filosum, Gld
.10..lawleyanum, Crosse
.05..nigrum, Totten
.15..quadrifilatum, Cpr
.05..reticulatum, DC
.05..scabrum, Olv

Blanneria, Shuttl
1.00..pellucida, Pfr

Bryophila, Cpr
.15..setosa, Cpr

Buccinum, L
.25..glacialis
.20..undatum, Lam
.25..undulatum, Moll

Bulimnea, Hald
.25..megasoma

Bulinus, Adams
.10..hypnorum, L

Bulla
.20..Adamsi, Mke
.20..ampulla, L
.15..occidentalis, Adams
.20..solitaria, Say

Busycon, Bolten
.50..perversum, L

Caecum, Flem
.10..californicum Dall
.25..crebricinctum, Cpr

Calliostoma, Sun
.50..annulatum, Mart
.20..canaliculatum Mart
.15..costatum, Mart
.50..gemmulatum
.50..exiguus, Pult
.15..striatus, L
.50..tricolor

Callista, Poli
.25..gigantea, Chem
.25..maculata, L
.50..lupisaria, L

Callopoma, Gray
.50..fluctuosum, Gray
.50..fokkesii, Jones
.25..tessellatum, Reeve

Calyptraea, Lam
.25..conica, Brod
.10..chinensis, L
.50..dilleyani, Gast
.20..equestris
.20..striata

Cancellaria, Lam
.35..reticulata, L
.30..similaris, Sby

Canthurus, Bolten
.50..tincta, Conr

Cardita, Brug
.25..affinis, Sby
.25..floridana, Conr
.15..sulcata, Lam

Cardium, L.
.50..aculeatum, L
2.00...blandum, Gld
.50...corbis, Mart
.10...consors, Brod
.20...islandicum
.50...isocardia, L
.75..magnum, Born
.25..muricatum
.15..mortoni, Conr
.10..norvegicum, Speng
1.00..paucicostatum, Sby
.25..serratum, L

Casmaria, H. & A. Ad.
.50...vibex, L

Cassidula, Ferrussac.
.50..crassiuscula

Cassis, Lamarck.
1.00..abbreviata, L
.75...eburneus, Brug
.50...undatum, Mart
.50...testiculus, L
1.00...tessellata

Ceratisolen, Forbes.
1.00...legumen, L

Cerithidea, Swains.
.20..ambigua, C B Ad
.10..californica, Nutt
.15...decollata, Lam
.10...icstoma, Pfr
.20...mazatlanica, Cpr
.25..montaguii, D'Orb
.25. obtusa, Lam
.15..ornata, Ads
.15..pulchra, C B Ad
.10...scalariformis, Say
.15...tennis, Pfr
.25...varicosa, Sby
.15..mamillata, Risso

Cerithiopsis, F. & H.
.15..tuberculata, Mart
.15...tuberularis, Mart

Cerithium, Brug.
.20...carbonarium
.20...echinatum, Lam
.05..ferrugineum, Say
.20..fasciatus, Wood
.10..fuscitum, Risso
.10..literatum, Born
.25...maculosum, Kien
.20...mamillatum, Risso
.10...morus, Lam
.10..muscarum, Say
.10..nigiescens, Mke
.40...nodulosum, Brug
.35...obeliscus, Brug
.25...polygonum, Sby
.20...reticulatum, DaCosta
.05...rupestre, Brug
.15..scabrum
.10...stercus-muscarum
.15..var
.05...septemstriatum, Say
.10..uncinatum, Gmel
.20..versicolor, C B Ad
.20...violaceum
.25...vulgatum, Brug

Chama, L.
.50..acnella, L
.22...arcinella, L
.25..exogyra, Conr
.25..macrophylla, Chemn
.20..spinosa
.00...sp indet Gulf Cal

Chemnitzia, D'Orb.
.25...castanea, Cpr
.25...stylina, Cpr
.25..tenuicula, Gld
.25..torquata

Chilina, Gray
1.00...fluctuosa, Gray
1.00...fluviatilis, Gray

Chione, Megerle
.25...californiensis, Brod
.20..cancellata, L
.50..dombei, Lam
.50..granulata, Gmel
.40...grata, Sby
.20...paphia, L

Chiton, L
.50..acuta, Cpr
.15..apiculatus, Say
.20..cinereus, L
.25..decoratus
.20...circulus
.20..gemmeus, Cpr
.25...lamuginosa, Cpr
1.00..tunicata, Sby
.50..hindsii, Gray
.30..mertensii
1.00..wassnessenskii, Midd
1.00...stelleri, Midd
.50...stokesii
.15..lineata, Wood
.30...rugatus
.70..lignosa, Gld
.40...merckii, Midd
1.00.. acrior

Chiton, L —Cont.
.20..striatus
.35...piceus, Gmel
.50..cooperi
.35...palmulatus, Cpr
Chlorostoma, Swains
.10...ater, Lesson
.10...argyrostomus, Gmel
.15...aureotinctum, Fbs
.15...brunneum, Phil
.15..lineata, Da Costa
.20...pfeifferi, Phil
Chrysodomus, Swain
.15..dirus, Rve
1.00..kennicotti, Dall
Circe, Schumacher
.25...divaricatus, Lam
.50...gibba, Lam
.35..rivularis, Born
Clypidella, Swainson
1.00..bimaculata, Dall
1.00..callomarginata
Collonia, Gray
.15..granulosa, Pse
.25..vitiensis, Bar
Columbella, Lam
.10...carinata, Hds
.10..cribraria, Lam
.20..concinna, Sby
.20..duclosiana, Sby
..flava, Lam
.05..fulgurans, Lam
.10..fuscata, Sby
.10...gausapata
.10...haemastoma, Sby
.15..lunatia, Sby
.20..lutea, Suoy
.20...maculosa, Sby
.20..major, Sby
.05..mercatoria, L
.10..nitiela, Lam
.20..obesa
.20..paytensis, Lesson
.05..rustica, L
.10..scripta, L
.15..scumpicata, Stearns
.20..strombiformis, Lam
.20..semiconvexa, Lam
.10..varians, Sby
.20..versicolor, Sby
.20..zebra, Gray
Cominella, Gray
.50..costata, Suoy
Concholepas, Lam
.25..peruviana, Lam
Conohelix, Swains
.50..conicus, Schum
Conus, L
.25..abbreviatus, Conr
.30..achatinus, Chemn
.75..amadis, Mart
1.00..ammiralis, L
.20..arachnoides, Gmel
1.25..araneosus, Hwass
.30..arena
.40..arenatus, Hwass
.50...archiepiscopus, Hw
.20...aristophanes, Ducl
1.25..augur, L
.10..aurantius, Hwass
.30..australis, Lam
1.25..bandanus, Hwass
1.25..betulinus, L
.50..capitaneus, Hwass
.25..catus, Hwass
.35..cedonulli, Brug
.30..ceylonensis, Hwass
.35..cinereus, Hwass
1.00..cingulum, Mart
.20..concinnus, Brod
1.00..costatus, Chem
.30..daucus, Hwass
.30..distans, Hwass
.40..eburreus, Hwass
.75..figulinus, L
.50..flavidus, Brug
.25..floridensis, Gabb
.10..franciscanus, Hwass
.25..fuscatus, Born
1.00..gabrieli, Kr
.50..generalis, L
.60..geographus, L
.40..gladiator, Brod
.30..glans, Hwass
.20..granulatus, Hwass
.35...gubernator, Brug
.25..hebraeus, L
1.00..hyena, Brug
1.25..imperialis, L
.25..interruptus, Sby
.30..lacteus, Lam
.50..legnarius, Rve
.50..leoninus, Brug
.60..lineatus, Chem
1.00..literatus, L
.30..lithoglyphus, Mench
.50..livi lus, Brug
1.50..maculatus, Sby
.25..mahogani, Sby
.50..marmoreus, L
.25..mediterraneus, Brug
1.00..mennomtaraon, Ch
.15..menotus, Brug
.35..miles, L
.25..miliaris, Hwass
1.00..millepunctatus, L
.25..minimus, L
.60..monile, Brug
.20..mus, Hwass
.25..musicus, Hwass
.20..nebulosus, L
.60..nussatella, Burg
.25..nux, Brod
.40..obesus, Brug
.40..omaria, Brug
.30..parius, Rve
.50..papilionaceus, Brug
1.00..pealii, Green
.25..planorbis, Born
1.00..princeps, L
1.00..prometheus, Hwass
.25..proteus, Hwass
.25..pulicarius, L
.25..punctatus, Ch
.25..punctieulatus, Hwass
.50..purpurascens, Brod
.20..pusillus, L
.25..pusio L
.60..quercinus, Hwass
.25..rattus, Brug
.25..regularis, Sby
.30..senator, L
.30..spectrum, L
.30..sponsalis, Chemn
.50..spurius, Gmel
.30..stercus-muscarumCh
.40...stellatus, Rve
.40..stramineus, Lam
.75..striatus, L
.50..sulcatus, Hwass
.50..sumatrensis, Lam
.25..taemiatus, Br
.35..terebra, Br
.30..terminus, Sby
.40...tessellatus, Brug
.25..testudineus, L
.60..textile, L
1.00..tiaratus, Brod
.30..tigris, L
.15..tornatus, Br
.50..tulipa, L
.35..varius, Brug
.20..venulatus, Hwass
.30..vermiculatus, Brug
.25..verrucosus, Brug
1.25..vexillum, Mart
1.00..victoriae, Rve
.60..virgo, L
.35..vitellus, L
.25..vitulinus, Br
1.00..vulpinus, Brug
Cooperella, Carp
.25..scintillaeformis, Cpr
Coralliophila H&A Ad
.50..costulata, Bld
Corbicula, Magerle
.50..pusilla, Bourg
Corbula, Brug
.15..contracta, Say
.10..gibba, Olioet
.10..inoequioalois
.20...lineolata, Say
.15..nucleus, L
Crassatella, Lam
.20..marginata, Cpr
Crenella, Brown
.10..glandula, Totten
.20..marmorata, Fbs
Crepidula, Lam
.05..aculeata, Gmel
.10...convexa, Say
.15..dorsata, var
.30..dilatata, Lam
.15..elongata
.15..excavata, Brod
.10..fornicata, Gmel
.10...marginalis, Brod
.20..onyx, Sby
.10..plana, Say
.10...unguiformis, Lam
Crucibulum, Schum
.35...corrugatum, Brod
.20..trigonale, Ad & Rve
.15...quinquinum, Les
Cryptogramma, Meh
.20..impressa, Hanley
.25..macrodon, "
.25..squamosa, "
Cuma, Humphrey
.25..coronatum, Lam
.25...imperialis, Lam
.25..kiosquiformis, Ducl
.25...sacellum, Lam
.25..tectum, Wood
Cumingia, Clessin
.15..tellinoides, Coast
Cyclas, Brug
.05..rivalis, Drap
.05..rivicola, Leach
.05..similis, Say
.05..staminea, Con
.05...transversa, Say
Cymba, Broil
1.00..neptuni, Gmel
.25...porcina, Brod
1.00...proboscidialis, Lam
Cypraea, Linn
.15..abella, Lam
.20...achatina, Soland
.25..acicularis
.50..adusta
.10...albuginosa, Maw
.50..amathystea, L
.25...annulus, L
.20..annulata, Gray
.40...approscimans
.50...arabica, L
.25..arenosa, Gray
.75..argus, L
.40..arenaria
.40...armalina
.10..asellus, L
..angustata, Gmel
.50..aurantium, Mart
.25..arabicula, Lam
.50..atomaria, Gmel
1.00..australis, Gray
1.00..bartheley-ii, Gmel
1.00..bicallosa, Gray
1.00..bicolor, Gask
.50..boivini, Kien
.15..caput-serpentus, L
.75..carneola, Mart
.25..caurica, L
.50..cervus, L
.15..cinerea, Gmel
.20...clandestina, L
.40..cruentata, Gmel
1.00..cervinetta, Kien
.25..cruenta, L
.25..cicercula, L
.35...cribraria, Lam
.50..chrysostoma, Kien
.15..citrina, Gray
.50..clara, Gask
.40..coffea, Gray
.50..concava, Gray
.25...childreni, Gross
.25..contamina, Gray
.30...controversa, Gray
.20..candidula
.25..costata
.5 ...capensis, Gray
.25..cervica, Sby
.40...comptonii, Gray
1.00..cribellum, Gask
.20..cylindrica, Born
.75..cumingii
.50..dubia, Gmel
.35..eburnea, Bar
.25..elentula, Sby
1.00..eglantina
.15..erosa, L
.25..errones, L
.10..europea, Mont
1.00..exanthema, L
.50..fasciata, Chem
.50..felina, Gmel
.50..flaveola, Lam.
.50..fimbriata, Gmel
.50..fraigilis, L
.50..fusca
1.00..gangrenosa, Dill
1.00..gemmula, Mof
1.00..goodallii, Gray
.75..gracilis, Gask
.75..guttata, Gray
.40..globosa, Kien
.15..helvola, L
.35..histrio, Kien
.25..hirundo, L
.30..isabella, L
.25..in ecta
.30..interrupta, Gray
.20..irrorata, Gray
.50..intermedia
.50..irina
.35..lamarckii, Gray
1.00..lurida, L
.25..lynx, L
.15..limacina, Lam
.50..lentiginosa, Gray
.50..lutea, Gmel
.50..listerii Gray
1.00..lathynis
.50..madagascariensis, Gm
1.00...mauritiana, L
1.00...mappa, L
.50..mus, L
.20..moneta, L
1.00..maculata, Barnes
1.00..moniliaris, Lam
.40..miliaris, Lam
1.00..menkiana, Desh
2.00..modesta
1.50..moosa, Brod
1.00..mougeriae
1.00..macula, A. Ad
1.50..microdon, Gray
2.00..mappa, var rosea
.25..neglecta, Sby
.20..nucleus, L
.30..nigropunctata
.50..nymphii
.25..nivea, Gray
.20..nivosa, Sby
.50..onyx, L
.25..occelata, L
.20..obvellata, L
.20..obesa
1.00..oniscus
.50..oryza
.10..pulex
1.00..princeps
1.00..physis, Brocchi
.40..pallida, Grey
1.00..pustulata, L
.50 pantherina, Grey
.30...picta, Gray
.15..poraria, L
1.00..punctulata, Gray
1.00...pulchella, Sw
.50..punctata, L
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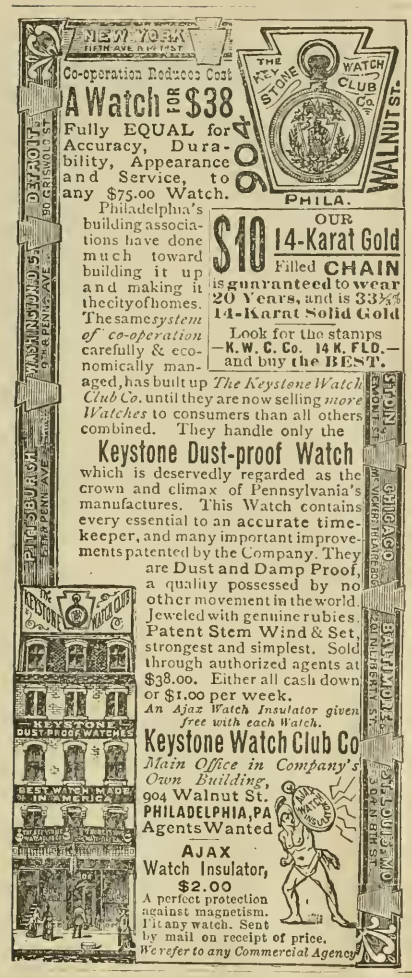

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A Letter From Dr. Hans von Bulow

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DR. HANS VON BULOW.

New York, April 6, 1880.
To Messrs. Wm. Knabe & Co.

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